Nanotechnology as a powerful tool for innovative therapeutics: the contribution of NANOMED Research Center in Catania

Rosario Pignatello
Department of Drug and Health Sciences
University of Catania, Italy

The NANOMED Center (*https://www.dsf.unict.it/it/nanomed*) was born in 2022 after the 10-year experience of NANO-*i*, the Research Center on Ocular Nanotechnology that was founded at the University of Catania. To embrace even more fields in the research and applications of nanomedicine in therapeutics and theranostics, and to better fit with the highly interdisciplinary nature of nanotechnologies and with the requests from pharma companies, the Center was converted into the actual name and structure, allowing researchers from other departments of our University to collaborate and share their studies and skills.

At present, NANOMED is organized in some focus areas, with the aim at scouting the funding opportunities in Italy and abroad, and to promote specialized studies, researches, and scientific debate in the various fields of innovative therapies (Drug Delivery & Targeting) and biomedical and pharmaceutical nanotechnologies. The main areas are ocular drug release, brain delivery (neurosciences), oral drug delivery, dermatological therapy, drug delivery and targeting in cancer and chemotherapies.

The main fields of study and research of the Center are:

- characterization, analysis, preclinical evaluation of active pharmaceutical compounds with potential application in the field of nanomedicine and drug delivery & targeting;
- chemical changes of the structure of compounds of pharmaceutical interest, in order to improve their pharmacokinetics and pharmacodynamics in the body;
- pre-formulation and formulation studies of new delivery and targeting systems;
- studying the effects of carrier-mediated active compounds with diagnostic and theranostic value in preventive medicine and therapy;
- formulation and pre-industrial development of drug delivery systems in established models of neurological and ophthalmic diseases, to investigate their therapeutic and clinical potential;
- evaluation by *in vitro, ex-vivo* and *in vivo* experimental models, including bioinformatics and computational models, of the biological and pharmacological activities, as well as of toxicological and eco-toxicological threats of nanostructured bioactives;
- applications of metabolomics to the research in the field;
- critical analysis of the scientific literature in the field of nanomedicine and nanotechnologies for biomedical and pharmaceutical applications;
- contributing, through the dialogue with relevant bodies, to the regulatory update in the biomedical and pharmaceutical nanotechnology sectors.